West Windsor-Plainsboro Regional School District

Grade 5 Mathematics

Updated August 2023

Math Equity Statement
ALL learners should have access to rigorous, high-level mathematical content in an environment where risk-taking, deep conceptual understanding, and growth mindset are the norm.

Catalyzing Change

Our District strategic goals lay the foundation for teaching and learning from a productive stance. *Catalyzing Change in Early Childhood and Elementary School Mathematics: Initiating Critical Conversations* pushes us to consider equitable mathematics practices and move from deficit to productive beliefs (NCTM, 2020). Our goal is to have each student see themselves as doers, knowers, and sense makers of mathematics. Leveraging *Catalyzing Change*, we have three focused areas to understand our work to help each and every student develop a positive math identity and have agency within their learning.

The three areas of focus in our math learning continue to be:

1. *Build a mathematics community* through routines & structures (experience wonder, joy, and beauty in mathematics, while building agency through making conjectures, justifying thinking, and building on one another's ideas)

2. *Deepen mathematical understanding* to develop confident and capable learners through grade level appropriate goals.

3. *Develop strong foundational skills* emphasizing reasoning and sense making to ensure the highest-quality mathematics education for each and every child.

Math Workshop

Math workshop is a model of instruction that allows all students to be engaged in mathematics learning, provide space for reflection, and for all students to realize their abilities as mathematicians. Math workshop model provides the structures for student choice, problem solving, targeted small group instruction, time throughout the year to practice the critical concepts of the grade level (Lempp, 2017).

For students, our classrooms need to be places where they are comfortable taking intellectual risks. In *From Reading to Math*, Sienna (2009) outlines four values to support students in taking risks and creating discourse. The values are:

- Value the thinking process as well as correct answers.
- Value problems for which more than one answer is possible.
- Value inquisitive responses.
- Value tolerance for mistakes. (Siena, 2009, p. 68).

Math workshop allows for these values to come through creating a supportive, collaborative learning environment for each and every student.

Number Sense Routines

We define a number sense routine as "an engaging, accessible, purposeful routine to begin your math class that promotes a community of positive mathematics and discussion" (Lempp, 2017, pg.146). It is usually done in the first 5-10 minutes of a math class. Number sense routines are the foundation of supporting social-emotional learning in mathematics. These routines invite all learners into the community while building positive math identity and sense making. It is where students begin to see themselves as doers, knowers, and sense-makers of mathematics.

Fluency

Fluency is the ability to apply procedures efficiently, flexibly, and accurately. Fluency is multifaceted and encompasses basic fact fluency, computational fluency and procedural fluency (Bay-Williams & SanGiovanni, 2021, p. 2). Bay-Williams and SanGiovanni (2021) define efficiency, flexibility, and accuracy as:

> *Efficiency:* Solving a procedure in a reasonable amount of time by selecting an appropriate strategy and readily implementing that strategy
> *Flexibility:* Knowing multiple procedures and applying or adapting strategies to solve procedural problems (Baroody & Dowker, 2003; Star, 2005 as cited by Bay-Williams & SanGiovanni, 2021, p.3).
> *Accuracy:* Correctly solving a procedure. (Bay-Williams & SanGiovanni, 2021, p. 3)

Additionally, Jennifer Bay-Williams and John SanGiovanni state, "Because effective instruction of (real) fluency values actions such as selecting, understanding, and evaluating strategies, as well as flexibility and reasonableness, students are able to develop strategic competence and adaptive reasoning. *These competencies positively shape their mathematics identity, while also nurturing their mathematical agency"* (NCTM, Figuring Out Fluency Presentation, New Orleans, 2022).

Grade 5 Big Ideas & Standards

In Grade 5, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume (NJDOE, NJSL-M, 2016).

A complete copy of the 2016 New Jersey Student Learning Standards for Grade 5 Mathematics may be found on the NJDOE's New Jersey Student Learning Standards for Mathematics webpage.

Unit 1: Expressions, Equations & Volume

Content Area: Elementary Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

Unit 1 helps us establish our rich learning communities so that students can see themselves as doers, knowers, and sense-makers of math. Students learn about volume and its connection to multiplication, leading them to a deeper understanding of the associative and commutative properties of multiplication. They will then move onto the exploration of surface area to better grasp the concept of volume and its difference from area. Toward the end of the unit students will develop multi-digit multiplication strategies for solving real-world problems efficiently. The concepts developed in this unit are key components for success with division and fractions throughout the rest of the year.

Recommended Pacing

Approximately 20 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.OA.A Write and interpret numerical expressions.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Standard 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NF.B.5a	Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
Standard 5.MD.C Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a “unit cube” is said to have “one cubic unit” of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.
5.MD.C.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
5.MD.C.5a	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge

	lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.
5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Creativity and Innovation: Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
Standard: 9.4 Critical Thinking and Problem-solving: The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Standard 9.4 Life Literacies and Key Skills: Technology Literacy: Collaborating digitally as a team can often develop a better artifact than an individual working alone.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.TL.4	Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: 8.1 Computer Science: Data & Analysis: Data can be organized, displayed, and presented to highlight relationships.	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
Standard: 8.2 Design Thinking: Engineering Design: Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.	
8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
Interdisciplinary Standards	
English Language Arts	
CPI #	**Cumulative Progress Indicator (CPI)**
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
Science: Engineering Design	
CPI #	**Cumulative Progress Indicator (CPI)**
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Social Studies	
Standard: 6.1 U.S. History: America in the World: Civics, Government, and Human Rights: Processes and Rules Rules, laws, and policies are designed to protect the rights of people, help resolve conflicts, and promote the common good.	
CPI #	**Cumulative Progress Indicator (CPI)**
6.1.5.CivicsPR.3	Evaluate school and community rules, laws and/or policies and determine if they meet their intended purpose.

Instructional Focus

Unit Enduring Understandings

- Multiplication involves counting groups of equal size and determining how many there are in all or using a representative set as a unit in a multiplicative comparison.
- A complex multiplication equation can be simplified using doubling and halving.
- Multiplication and division are related.
- Division names a missing factor in terms of a known factor and the product.
- Division can be interpreted as fair sharing or as repeated subtraction.
- Remainders can be interpreted in multiple ways based on the content of the problem.
- Area, perimeter, and volume are related.
- As the shapes of regions or three-dimensional objects while maintaining the same areas or volumes, there is an effect on the perimeters and surface areas.

Unit Essential Questions

- How are the associative and commutative properties of multiplication related to volume?
- How can multi-digit multiplication strategies be utilized to solve real world problems in elegant and efficient ways?
- How can the area model be used to show the relationship between multiplication and division?

Objectives

We are learning to/that:

- Write numerical expressions that contain parentheses.
- Evaluate numerical expressions with parentheses.
- Write a simple expression to record calculations with numbers.
- Interpret numerical expressions without evaluating them.
- Divide a 3-digit whole number by a 2-digit whole number using strategies based on place value, the properties of operations, or the relationship between multiplication and division.
- Compare the size of a product to the size of one of its factors on the basis of the size of the other factor, without performing the indicated multiplication.
- Demonstrate an understanding that a solid figure that can be packed without gaps or overlaps by *n* cubes has a volume of *n* cubes.

- Measure the volume of a solid figure by counting the number of cubic units that fill it, with no gaps or overlaps.
- Show that the volume of a right rectangular prism with whole number edge lengths can be found by multiplying the edge lengths or by multiplying the area of the base by the height.
- Represent the product of three whole numbers as the volume of a right rectangular prism whose edge lengths are equal to those three whole numbers.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 1 will provide opportunities for teachers to observe students showing what they know with multiplication, fact fluency, factors and multiples, multi-digit multiplication and division, and evaluating expressions.

- ☑ Formative Assessment
- ☑ Summative Assessment
- ☑ Alternative Assessment
- ☑ Benchmark

Resources

Foundational Text:

Bridges in Mathematics Grade 5 by The Math Learning Center

Instructional & Professional Resources:

- Exemplars*, Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- DreamBox Learning (Digital Tool)
- *Math in Practice: Teaching Fifth Grade Math* by Joan Petti Tellis, Susan O'Connell, & John SanGiovanni
- *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by Jennifer Lempp
- *Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching* by Jo Boaler
- *Mindset Mathematics: Visualizing and Investigating Big Ideas, Grade 5* by Jo Boaler, Jen Munson, & Cathy Williams
- *Mine the Gap for Mathematical Understanding, 3-5* by John J. SanGiovanni
- *Teaching Student Centered Mathematics: Developmentally Appropriate Instruction for Grades 3-5 (Volume II)* by John A. Van de Walle, Karen S. Karp, LouAnn H. Lovin, & Jennifer M. Bay-Williams

Additional Supports

WW-P Accommodations and Assessment (Reference Tool and Glossary)

Unit 2: Adding and Subtracting Fractions

Content Area: Mathematics

Course & Grade Level: 5

Summary and Rationale

In this unit, students focus on the fraction work of equivalency, adding and subtracting fractions, and comparing fractions, and using different approaches to finding common denominators. They develop their understanding of these concepts by using tools like clocks, number lines and tables. Toward the end of the unit students will take these strategies further by applying them to solve a variety of story problems involving fractions.

Recommended Pacing

Approximately 20 days

New Jersey Student Learning Standards for Mathematics

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Standard 5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
5.NF.A.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g. by using visual fractions models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
Standard 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NF.B.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*
5.NF.B.4a	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.

5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Creativity and Innovation: Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
Standard: 9.4 Critical Thinking and Problem-solving: The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Standard 9.4 Life Literacies and Key Skills: Technology Literacy: Collaborating digitally as a team can often develop a better artifact than an individual working alone.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.TL.4	Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: 8.1 Computer Science: Data & Analysis: Data can be organized, displayed, and presented to highlight relationships.	
CPI #	
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
Standard: 8.2 Design Thinking: Engineering Design: Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.	
8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
Interdisciplinary Standards	
English Language Arts	
CPI #	**Cumulative Progress Indicator (CPI)**
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
Instructional Focus	
Unit Enduring Understandings	
● There are multiple models and/or procedures for computing with fractions just as with whole numbers. ● The meanings of operations on fractions are the same as the meanings for the operations on whole numbers. Operations with fractions should begin by applying these same meanings to fractional parts. ● The numerator counts the number of parts and the denominator the type of part What is being counted). When denominators are different, an equivalent problem can be written. ● Double number lines are ratio tables allow for methodical and visual opportunities to create common denominators	

Unit Essential Questions

- How can everyday objects and understandings aid further mathematical concepts?
- How can a variety of strategies aid in developing a deeper understanding of common denominators?
- Why is it important to be able to model addition and subtraction of fractions?

Objectives

We are learning to/that:

- Add fractions with unlike denominators, including mixed numbers.
- Subtract fractions with unlike denominators, including mixed numbers.
- Rewrite fractions with unlike denominators as equivalent fractions with a common denominator in order to find their sum or difference.
- Solve story problems involving addition of fractions referring to the same whole, with like and unlike denominators.
- Solve story problems involving subtraction of fractions referring to the same whole, with like and unlike denominators.
- Mentally estimate the answers to story problems involving addition and subtraction of fractions with like and unlike denominators.
- Assess the reasonableness of answers to story problems involving addition and subtraction of fractions with like and unlike denominators.
- Solve story problems involving division of whole numbers with fraction or mixed number quotients
- Multiply a whole number by a fraction.
- Solve story problems involving multiplying a whole number by a fraction.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 2 will provide opportunities for teachers to observe students showing what they know by adding and subtracting fractions and mixed numbers with unlike denominators.

- ☑ Formative Assessment
- ☑ Summative Assessment
- ☑ Alternative Assessment
- ☑ Benchmark

Resources

Foundational Text:

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Additional Supports
WW-P Accommodations and Assessment (Reference Tool and Glossary)

Unit 3: Place Value and Decimals

Content Area: Elementary Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

Unit 3 supports students in learning about place value and its various applications. They practice reading, writing, and comparing decimals, as well as rounding numbers. Using their place value knowledge, they learn to convert within a measurement system. Students will use their place value understanding to add and subtract decimals up to the hundredths place. The end of the unit focuses on division, where students model, solve, and create long division problems.

Recommended Pacing

Approximately 20 days

New Jersey Student Learning Standards for Mathematics

Standard 5.NBT.A Understand the place value system.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.NBT.A.3	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
5.NBT.A.4	Use place value understanding to round decimals to any place.
Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Standard: 5.MD.A Convert like measurement units within a given measurement system.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system.
Standard: 5.MD.B Represent and interpret data	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**

5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.
5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Creativity and Innovation: Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
Standard: 9.4 Critical Thinking and Problem-solving: The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Standard 9.4 Life Literacies and Key Skills: Technology Literacy: Collaborating digitally as a team can often develop a better artifact than an individual working alone.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.TL.4	Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: 8.1 Computer Science: Data & Analysis: Data can be organized, displayed, and presented to highlight relationships.	
CPI #	**Cumulative Progress Indicator (CPI)**
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8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
Interdisciplinary Standards	
English Language Arts	
CPI #	**Cumulative Progress Indicator (CPI)**
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
Instructional Focus	
Unit Enduring Understandings	

- The base ten place value system extends infinitely in two directions: very small values to very large values. Between any two place values the 10:1 ratio remains the same.
- The visual concepts and understanding that a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left, allows for transfer to a deeper understanding of metrics conversions.
- Decimals are simply another way of writing fractions, and are also called decimal fractions. Maximum flexibility is gained by understanding how the two symbol systems are related.
- The decimal point is a convention that has been developed to indicate the unit's position. The position to the left of the decimal point marks the location of the unit's place.
- Base ten blocks can serve as a means to deeper understanding of long division and aid in more abstract methods of modeling and solving.

Unit Essential Questions

- How can place value connect to metric conversions?
- Why is it imperative to develop a strong understanding of place value prior to extending these concepts to new understandings?
- How does the area model aid in developing a conceptual understanding of long division?

Objectives

We are learning to/that:

- Demonstrate an understanding that in a multi-digit number, each digit represents one-tenth what it represents in the place to its left.
- Explains patterns in the number of zeros in the product when multiplying by powers of 10 and and in the placement of the decimal point when multiplying or dividing by powers of 10.
- Writes decimals to the thousandths with base ten numerals, words, and in expanded form.
- Compare pairs of decimals to thousandths, based on an understanding of what the digit in each place represents.
- Uses >, =, and < symbols to record comparisons of two decimals to thousandths.
- Round decimals to the nearest one, tenth and hundredth.
- Divides a 3-digit whole number by a 2-digit whole number using strategies based on place value, the properties of operations or the relationship between multiplication and division.
- Add and subtract decimals to hundredths, using concrete models or drawings and strategies based on place value and properties of operations, and the relationship between addition and subtraction.
- Add and subtract fractions with unlike denominators, including mixed numbers.
- Convert among different-sized standard measurement units within a given measurement.
- Make a line plot to display a data set composed of measurement taken in half, fourth and eighths of a unit.
- Solve problems involving addition, subtraction, and multiplication of fractions shown on a line plot.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 3 will provide opportunities for teachers to observe students showing what they know with reading, writing, comparing, and rounding decimals to thousandths, as well as adding and subtracting decimals to hundredths and fractions with unlike denominators.

- ☑ Formative Assessment
- ☑ Summative Assessment
- ☑ Alternative Assessment
- ☑ Benchmark

Resources
Foundational Text: *Bridges in Mathematics* Grade 5 by The Math Learning Center **Instructional & Professional Resources:** ● Exemplars*, Problem Solving for the 21st Century* ● K-5 Math Teaching Resources ● DreamBox Learning (Digital Tool) ● *Math in Practice: Teaching Fifth Grade Math* by Joan Petti Tellis, Susan O'Connell, & John SanGiovanni ● *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by Jennifer Lempp ● *Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching* by Jo Boaler ● *Mindset Mathematics: Visualizing and Investigating Big Ideas, Grade 5* by Jo Boaler, Jen Munson, & Cathy Williams ● *Mine the Gap for Mathematical Understanding, 3-5* by John J. SanGiovanni ● *Teaching Student Centered Mathematics: Developmentally Appropriate Instruction for Grades 3-5 (Volume II)* by John A. Van de Walle, Karen S. Karp, LouAnn H. Lovin, & Jennifer M. Bay-Williams
Additional Supports
WW-P Accommodations and Assessment (Reference Tool and Glossary)

Unit 4: Multiplying & Dividing Whole Numbers and Decimals	
Content Area: Elementary Mathematics	
Course & Grade Level: Mathematics, Grade 5	
Summary and Rationale	
In this unit, students return to the study of multiplication and division strategies, including the standard multiplication algorithm. In the first half of the unit, students explore various strategies that build upon their estimation and mental math abilities, enhancing their overall number sense. The unit ends with a focus on the link between multiplication and division, utilizing the area model and ratio tables to help students become more comfortable with long division.	
Recommended Pacing	
Approximately 25 days	
New Jersey Student Learning Standards for Mathematics	
Standard 5.OA.A Write and interpret numerical expressions.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*
Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Standard 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.NF.B.4a	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product (a/b) × q as a part of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q / b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)
Standard 5.MD.C. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

	b. Apply the formulas V = l × w × h and V = B × h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.
5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Creativity and Innovation: Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
Standard: 9.4 Critical Thinking and Problem-solving: The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Standard 9.4 Life Literacies and Key Skills: Technology Literacy: Collaborating digitally as a team can often develop a better artifact than an individual working alone.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.TL.4.	Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: 8.1 Computer Science: Data & Analysis: Data can be organized, displayed, and presented to highlight relationships.	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
Standard: 8.2 Design Thinking: Engineering Design: Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.	
8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
Interdisciplinary Standards	
English Language Arts	
CPI #	**Cumulative Progress Indicator (CPI)**
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Flexible methods of computation for multiplication and division involve taking apart (decomposing) and combining (composing) numbers in a variety of ways.
- The relationships between fractions, decimals, and whole numbers, and the process of doubling and halving allow for stronger estimation and mental math skills when multiplying and dividing.
- Flexible methods for computation require a deep understanding of the properties of operations (associative, commutative and distributive property of multiplication).
- Multiplication and division are related as inverse operations.
- The area and partial products model provides a visual representation to develop a conceptual understanding of multiplication and its properties that are also applied in the standard algorithm.
- Multiplication can be utilized to estimate and solve long division problems mentally.
- Multiplication and division of two numbers will produce the same digits, regardless of the positions of the decimal point; as such, multiplicative computations with decimal fractions can be performed as whole numbers using estimation and the identification of patterns.
- Algorithms for computing with decimals are derived directly from algorithms for computing with whole numbers.

Unit Essential Questions

- How can number sense strategies leverage the relationship between multiplication and division?
- How can the area model and partial products ensure how and why the standard algorithm of multiplication functions?
- Can a product be smaller than its factors?

Objectives

We are learning to/that:

- Evaluate numerical expressions that contain parentheses.
- Use the standard algorithm with fluency to multiply multi-digit whole numbers.
- Divide a 2- or 3-digit whole number using strategies based on place value, the properties of operations, or the relationship between multiplication and division.
- Add and subtract decimals to hundredths, using concrete models or drawings and strategies based on place value and properties of operations.
- Multiply and divide decimals to hundredths, using concrete models or drawings and strategies based on place value and properties of operations.
- Use written numbers and symbols to represent strategies for computing with decimals to hundredths to written methods.
- Multiply a whole number by a fraction.
- Convert among different sized student measurement units within a given measurement system.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 4 will provide opportunities for teachers to observe students showing what they know with multi-digit multiplication and division of whole numbers, fractions and decimals.

- ☑ Formative Assessment
- ☑ Summative Assessment
- ☑ Alternative Assessment
- ☑ Benchmark

Resources
Foundational Text: *Bridges in Mathematics* Grade 5 by The Math Learning Center **Instructional & Professional Resources:** ● Exemplars*, Problem Solving for the 21st Century* ● K-5 Math Teaching Resources ● DreamBox Learning (Digital Tool) ● *Math in Practice: Teaching Fifth Grade Math* by Joan Petti Tellis, Susan O'Connell, & John SanGiovanni ● *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by Jennifer Lempp ● *Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching* by Jo Boaler ● *Mindset Mathematics: Visualizing and Investigating Big Ideas, Grade 5* by Jo Boaler, Jen Munson, & Cathy Williams ● *Mine the Gap for Mathematical Understanding, 3-5* by John J. SanGiovanni ● *Teaching Student Centered Mathematics: Developmentally Appropriate Instruction for Grades 3-5 (Volume II)* by John A. Van de Walle, Karen S. Karp, LouAnn H. Lovin, & Jennifer M. Bay-Willia
Additional Supports
WW-P Accommodations and Assessment (Reference Tool and Glossary)

Unit 5: Multiplying & Dividing Fractions

Content Area: Elementary Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

Unit 5 focuses on extending students' understanding of multiplication and division to include fractions. Rectangular arrays are used as a tool to model and solve fraction-by-fraction multiplication problems. Toward the end of the unit, students are introduced to division involving whole numbers by unit fractions and unit fractions by whole numbers.

Recommended Pacing

Approximately 25 days

New Jersey Student Learning Standards for Mathematics

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

CPI #	Cumulative Progress Indicator (CPI)
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Standard 5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.

CPI #	Cumulative Progress Indicator (CPI)
5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators

Standard 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CPI #	Cumulative Progress Indicator (CPI)
5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product (a/b) × q as a part of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q / b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.) b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5.NF.B.5	Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principal of fraction equivalence to the effect of multiplying a/b by 1.
5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.B.7	Apply and extend previous understanding of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. interpret division of a unit fraction by a non-zero whole number, and compute such quotients. b. Interpret division of a whole number by a unit fraction, and compute such quotients. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.
5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Creativity and Innovation: Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
Standard: 9.4 Critical Thinking and Problem-solving: The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Standard 9.4 Life Literacies and Key Skills: Technology Literacy: Collaborating digitally as a team can often develop a better artifact than an individual working alone.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.TL.4.	Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: 8.1 Computer Science: Data & Analysis: Data can be organized, displayed, and presented to highlight relationships.	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
Standard: 8.2 Design Thinking: Engineering Design: Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.	
8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
Interdisciplinary Standards	
English Language Arts	

CPI #	Cumulative Progress Indicator (CPI)
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- A whole number multiplied by a proper fraction results in a product that is smaller than itself.
- A whole number divided by a proper fraction results in a quotient that is larger than itself.
- A whole number multiplied by a proper fraction results in a product that is smaller than itself.
- A whole number divided by a proper fraction results in a quotient that is larger than itself.
- Strategies and models used in whole number multiplication and division can be applied to multiplication and division of fractions and mixed numbers.
- Multiplying a whole number by a fraction involves division, as the product is a fraction of the whole number.
- There are two ways to think about division by a fraction - partition and measurement.
- Estimation should be an integral part of developing fraction computation to focus students' attention on the meanings of the operations and the expected size of the results.

Unit Essential Questions

- How can we model multiplication and division problems using words, numbers, and models?
- Can a product be smaller than its factors?
- Why is it important to be able to model multiplication and division of fractions?
- How are multiplication and division related?

Objectives

We are learning to/that:

- Add and subtract fractions with unlike denominators, including mixed numbers.
- Multiply a whole number by a fraction.
- Multiply a fraction by a fraction.
- Demonstrate the area of a rectangle with fractional side lengths.
- Represent the product of two fractions as an array.
- Compare the size of a product to the size of one of its factors.
- Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number.
- Explain why multiplying a given number by a fraction greater than 1 results in a product greater than a given number.
- Use visual models to divide a unit fraction by a whole number and to divide a whole number by a unit fraction.
- Solve story problems involving division of a unit fraction by a whole number, division of a whole number by a fraction, multiplication of a whole number by a fraction, and multiplication of a fraction by a fraction.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 5 will provide opportunities for teachers to observe

students showing what they know with adding and subtracting fractions, multiplying whole numbers by fractions, and multiplying fractions by fractions.
☑ Formative Assessment
☑ Summative Assessment
☑ Alternative Assessment
☑ Benchmark
Resources
Foundational Text: *Bridges in Mathematics* Grade 5 by The Math Learning Center **Instructional & Professional Resources:** ● Exemplars*, Problem Solving for the 21st Century* ● K-5 Math Teaching Resources ● DreamBox Learning (Digital Tool) ● *Math in Practice: Teaching Fifth Grade Math* by Joan Petti Tellis, Susan O'Connell, & John SanGiovanni ● *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by Jennifer Lempp ● *Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching* by Jo Boaler ● *Mindset Mathematics: Visualizing and Investigating Big Ideas, Grade 5* by Jo Boaler, Jen Munson, & Cathy Williams ● *Mine the Gap for Mathematical Understanding, 3-5* by John J. SanGiovanni ● *Teaching Student Centered Mathematics: Developmentally Appropriate Instruction for Grades 3-5 (Volume II)* by John A. Van de Walle, Karen S. Karp, LouAnn H. Lovin, & Jennifer M. Bay-Williams
Additional Supports
WW-P Accommodations and Assessment (Reference Tool and Glossary)

Unit 6: Graphing, Geometry, & Volume

Content Area: Elementary Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

During this sixth unit, students are formally introduced to several geometric concepts. They learn about coordinate graphing and classifying two-dimensional shapes. The concept of volume will be revisited and extended as students become familiar with standard volume formulas. The unit ends with a quick recap of fraction and mixed number multiplication, applied in the context of creating banners and flags.

Recommended Pacing

Approximately 20 days

New Jersey Student Learning Standards for Mathematics

Standard 5.OA.B Analyze patterns and relationships.

CPI #	Cumulative Progress Indicator (CPI)
5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms form the two patterns, and graph the ordered pairs on a coordinate plane.

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

CPI #	Cumulative Progress Indicator (CPI)
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

CPI #	Cumulative Progress Indicator (CPI)
5.NBT.B.7	Add, subtract, multiply and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Standard 5.MD.C Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CPI #	Cumulative Progress Indicator (CPI)
5.MD.C.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

	c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
Standard 5.G.A Graph points on the coordinate plane to solve real-world and mathematical problems.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.G.A.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of on axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Standard 5.G.B Classify two-dimensional figures into categories based on their properties.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.G.B.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
5.G.B.4	Classify two-dimensional figures in a hierarchy based on properties.
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.
5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Creativity and Innovation: Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
Standard: 9.4 Critical Thinking and Problem-solving: The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Standard 9.4 Life Literacies and Key Skills: Technology Literacy: Collaborating digitally as a team can often develop a better artifact than an individual working alone.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.TL.4.	Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).

New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: 8.1 Computer Science: Data & Analysis: Data can be organized, displayed, and presented to highlight relationships.	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
Standard: 8.2 Design Thinking: Engineering Design: Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.	
8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
Interdisciplinary Standards	
English Language Arts	
CPI #	**Cumulative Progress Indicator (CPI)**
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
Instructional Focus	
Unit Enduring Understandings	
● Volume is determined by the amount of cubic units that fit into a three dimensional object. The formula for calculating volume of a rectangular prism is directly connected to its physical shape. ● The coordinate system consists of an origin, axes, and coordinates that are used to represent and interpret real world situations. ● Shapes can be described in terms of their location in a plane or in space. Coordinate systems can be used to describe these locations precisely. In turn, the coordinate view of a shape offers another way to understand certain properties of shapes. ● Ordered pairs are used to locate specific locations on a coordinate plane.	
Unit Essential Questions	
● How is a coordinate plane related to real-world situations? ● How is volume related to multiplication and addition? ● What are the attributes of an object that has volume? ● How can we model multiplication and division problems using words, numbers, and models?	
Objectives	
We are learning to/that: ● Generate two numerical patterns given two different rules. ● Identify relationships between corresponding terms in two numerical patterns. ● Graph ordered pairs on a coordinate plane consisting of the corresponding terms in two numerical patterns. ● Make a line plot to display a data set comprised of measurements taken to the nearest half, quarter, and eighth of a unit. ● Show that the volume of a right rectangular prism with whole number edge lengths can be found by multiplying the edge lengths. ● Represent the product of three whole numbers as the volume of a right rectangular prism. ● Use the formula $V = l \times w \times h$ to find the volume of a right rectangular prism. ● Use the formula $V = B \times h$ to find the volume of a right rectangular prism. ● Solve story problems involving finding the volume of a solid figure composed of two non-overlapping right rectangular prisms. ● Locate a point on a coordinate plane based on its ordered pair of coordinates. ● Writes the x- and y-coordinates of a given point in a coordinate plane as an ordered pair.	

- Graph points in the first quadrant of the coordinate plane to represent a problem.
- Describe the meaning of the values of coordinate points based on the context of a problem or situation.
- Demonstrate an understanding that attributes of a category of two-dimensional figures also belong to all subcategories of that category.
- Classify two-dimensional figures based on their attributes.
- Classify two-dimensional figures within a hierarchy based on properties.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 6 will provide opportunities for teachers to observe students showing what they know with coordinate graphing, shape classification, and volume.

☑ Formative Assessment	
☑ Summative Assessment	
☑ Alternative Assessment	
☑ Benchmark	

Resources

Foundational Text:

Bridges in Mathematics Grade 5 by The Math Learning Center

Instructional & Professional Resources:

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- K-5 Math Teaching Resources
- DreamBox Learning (Digital Tool)
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Additional Supports

WW-P Accommodations and Assessment (Reference Tool and Glossary)

Unit 7: Division & Decimals

Content Area: Elementary Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

In Unit 7, students delve deeper into division and its connection with multiplication. They also explore rates and equivalent ratios to solve division problems, even with fractions. They continue to develop this conceptual knowledge throughout the unit by solving various division story problems and then discussing decisions about how to handle and interpret remainders. The unit wraps up with a review of division involving whole numbers by unit fractions and unit fractions by whole numbers.

Recommended Pacing

Approximately 20 days

New Jersey Student Learning Standards for Mathematics

Standard 5.OA.A Write and interpret numerical expressions.

CPI #	Cumulative Progress Indicator (CPI)
5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

Standard 5.NBT.A Understand the place value system.

CPI #	Cumulative Progress Indicator (CPI)
5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

CPI #	Cumulative Progress Indicator (CPI)
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Standard 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CPI #	Cumulative Progress Indicator (CPI)
5.NF.B.3	Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?
5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.[1]

	a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.* b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.* c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.
5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Creativity and Innovation: Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
Standard: 9.4 Critical Thinking and Problem-solving: The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Standard 9.4 Life Literacies and Key Skills: Technology Literacy: Collaborating digitally as a team can often develop a better artifact than an individual working alone.	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.TL.4.	Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: 8.1 Computer Science: Data & Analysis: Data can be organized, displayed, and presented to highlight relationships.	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
Standard: 8.2 Design Thinking: Engineering Design: Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.	
8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.

Interdisciplinary Standards	
English Language Arts	
CPI #	**Cumulative Progress Indicator (CPI)**
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Understanding place value allows us to efficiently multiply and divide by powers of ten.
- Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
- Multiplication and division problems can be solved using a toolkit of strategies, including multiplying to divide, partial quotients, overs and unders, and equivalent ratios.
- Multiplication and division of two numbers will produce the same digits, regardless of the positions of the decimal points. As a result, multiplicative computations with decimal fractions can be performed as whole numbers with the decimal placed by way of estimation and identification of patterns.
- Algorithms for computing with decimals are derived directly from algorithms for computing with whole numbers.

Unit Essential Questions

- How can division strategies, such as multiplying to divide, partial quotients, overs and unders, and equivalent ratios be used to solve division problems involving whole numbers, fractions, and decimals?
- How does understanding place value help us to perform operations, particularly with multiplication and division?
- How does multiplying and dividing by powers of ten affect the product or quotient of a problem?
- What are the different ways that we can interpret division via equations, pictures, or models?

Objectives

We are learning to/that:

- Write and evaluate numerical expressions with parentheses.
- Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
- Explain patterns in the number of zeros in the product when multiplying by powers of ten.
- Explain patterns in the placement of the decimal point when multiplying or dividing by powers of 10.
- Denote powers of 10 with whole-number exponents.
- Divide a 2-, 3-, or 4- digit whole number by a 2- digit whole number using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.
- Use equations, rectangular arrays, and area models to explain strategies for dividing multi-digit whole numbers.
- Multiply and divide decimals to hundredths, using concrete models and strategies based on place value, and explain the reasoning behind those strategies.
- Relate strategies for computing with decimals to hundredths to written methods.
- Use written numbers and symbols to represent strategies for computing with decimal to hundredths.
- Solve story problems involving division of whole numbers with fraction or mixed number quotients (e.g., 3÷4 = ¾).
- Multiply a whole number by a fraction and solve related story problems.
- Divide a unit fraction by a whole number using visual models.

- Divide a whole number by a unit fraction using visual models.
- Solve story problems involving division of a whole number by a unit fraction and vice versa.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 7 will provide opportunities for teachers to observe students showing what they know with writing and evaluating numerical expressions and solving multi-digit division combinations.

- ☑ Formative Assessment
- ☑ Summative Assessment
- ☑ Alternative Assessment
- ☑ Benchmark

Resources

Foundational Text:

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Instructional & Professional Resources:

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- K-5 Math Teaching Resources
- DreamBox Learning (Digital Tool)
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Additional Supports

WW-P Accommodations and Assessment (Reference Tool and Glossary)

Unit 8: Solar Design

Content Area: Elementary Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

In this final unit, students work on designing and constructing scaled model houses with solar energy features. They explore different aspects of solar energy like reflection, absorption, and concentration, and learn ways to collect and store the sun's rays, while applying various math skills learned during the year. Finally, students build model houses using student-created scaled side-view drawings and floor plans.

Recommended Pacing

Approximately 16 days

New Jersey Student Learning Standards for Mathematics

Standard: 5.NBT.B Perform operations with multi-digit whole numbers and decimals to hundredths.

CPI #	Cumulative Progress Indicator (CPI)
5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Standard: 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CPI #	Cumulative Progress Indicator (CPI)
5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
5.NF.B.7c	Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*

Standard 5.MD.A Convert like measurement units within a given measurement system.

CPI #	Cumulative Progress Indicator (CPI)
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Standard 5.MD.C Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.
Standard: 5.G.A Graph points on the coordinate plane to solve real-world and mathematical problems.	
CPI #	**Cumulative Progress Indicator (CPI)**
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
5.MP.1	Make sense of problems and persevere in solving them.
5.MP.2	Reason abstractly and quantitatively.
5.MP.3	Construct viable arguments and critique the reasoning of others.
5.MP.4	Model with mathematics.
5.MP.5	Use appropriate tools strategically.
5.MP.6	Attend to precision.
5.MP.7	Look for and make use of structure.
5.MP.8	Look for and express regularity in repeated reasoning.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: 9.4 Life Literacies and Key Skills: Creativity and Innovation **Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.**	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
Standard: 9.4 Life Literacies and Key Skills: Critical Thinking and Problem-solving **The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.**	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Interdisciplinary Standards	
English Language Arts	
CPI #	**Cumulative Progress Indicator (CPI)**
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Science: Engineering Design	
CPI #	**Cumulative Progress Indicator (CPI)**
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Science: Earth and Human Activity	
5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment, and address climate change issues.
Science: Energy	
MS-PS3-1	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
MS-PS3-4	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

Instructional Focus

Unit Enduring Understandings

- Absorption is the process of taking or drawing in solar energy.
- Reflection is the process of moving in one direction, hitting a surface, and then quickly moving in a different and usually opposite direction (as it applies to solar energy.)
- Thermometers and graphing allow for patterns of observations of temperature change over time and throughout the day.
- Surface area can impact the amount of solar energy an object can absorb.

Unit Essential Questions

- Why do we need solar energy?
- Where have you seen solar energy at work?
- How do you think solar energy collectors work?
- What materials do solar collectors use? Are some materials more efficient than others?
- What are some design features of a solar house?

Objectives

We are learning to/that:

- Multiply multi-digit whole numbers using the standard algorithm with fluency.
- Divide a 4-digit whole number by a 2-digit whole number using multiple strategies.
- Add, subtract, multiply, and divide decimals to hundredths, using multiple strategies.
- Multiply a whole number by a fraction.
- Demonstrate the area of a rectangle with fractional side lengths.
- Solve story problems involving multiplication of fractions and mixed numbers and division of a unit fraction by a whole number.
- Convert among different-sized standard measurement units within a given measurement system and solve related multi-step story problems.
- Represent the product of three whole numbers as the volume of a right rectangular prism.
- Use the formula $V = l \times w \times h$ or $V = B \times h$ to find the volume of a right rectangular prism.
- Graph points in the first quadrant of the coordinate plane to represent and solve a problem.
- Describe the meaning of the values of coordinate points based on the context of a problem or situation.

Evidence of Learning

Assessment

The assessment plan may include teacher-designed formative and summative assessments, district common assessments, self-assessments, and analysis of standardized benchmark and interim assessment data. During each common, formative, and summative assessment, teachers will provide accommodations and alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. The assessment activities in Unit 8 will provide opportunities for teachers to observe students showing what they know with calculating area and volume, constructing and interpreting line graphs and graphing points in a coordinate plane, multiplication, division, and other operations using decimals and fractions.

- ☑ Formative Assessment
- ☑ Summative Assessment
- ☑ Alternative Assessment
- ☑ Benchmark

Resources

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Additional Supports

WW-P Accommodations and Assessment (Reference Tool and Glossary)

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